

REMARKS

In the Office Action, the disclosure was objected to. Claims 1-12 and 16 were objected to. Claims 1-18 were rejected under 35 USC §112, second paragraph. Claims 1-18 were rejected under 35 USC §103(a) as being unpatentable over Holzhüter in view of Dufour.

U.K. Patent Application GB2058218 deals with minimizing losses due to secondary flows, sometimes named as re-circulating flows. They are in the form of vortices with direction of rotation opposite to that of the main stream. Such flows are found usually at the tips of the impeller vanes on exit and inlet sides. These losses are accounted for as part of the total losses assumed within the major elements of the pump. Therefore, the referred to systems tackle partial elimination of total losses encountered for inside rotodynamic pumps.

Theoretically the elimination of secondary flows would contribute, to a certain limit, in increasing the static pressure on the suction side of the pump. That in turn, would partly improve the NPSHR pressure on the suction side of the pump. That in turn, would partly improve the NPSHR (the net positive suction head required).

In the present invention, delivery of some of the outlet flow to the inlet covers a different aspect, involving not only the achievement of better NPSH, but also giving higher performances of

head, efficiency and decrease in power input. The design of these two systems are basically different.

GB2058218 describes the fluid in the chamber passing through narrow passages directly to the impeller inlet. The arrangement of leading the fluid from the delivery side (and within the volute casing and not the outlet) of the pump, to enter a flow chamber around the intake side of the pump via a plurality of peripherally distributed apertures suggested that the reference would have a function similar to a series of fixed guide vanes stationed before the impeller. The function of these fixed vanes is to guide the fluid in a certain direction (i.e. to create swirl) and increase its velocity.

The bleed flow in the present invention, on the other hand, is analogous to the placement of a second impeller in front of the original one. Also GB 2058218 is not for multi-phase flow.

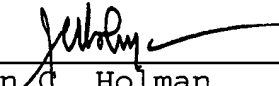
U.S. Patent No. 5,385,443 to Dufour is injecting air (gas) inside the impeller disc and not into the inlet. This technique does not allow for the required and proper mixing. It is also not a multi-phase flow pumping arrangement.

Based on the foregoing amendments and remarks, it is respectfully submitted that the claims in the present application, as they now stand, patentably distinguish over the references cited and applied by the Examiner and are, therefore, in condition for allowance. A Notice of Allowance is in order, and such favorable action and reconsideration are respectfully requested.

However, if after reviewing the above amendments and remarks, the Examiner has any questions or comments, he is cordially invited to contact the undersigned attorneys.

Respectfully submitted,

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